What is claimed is:

1. A direction of arrival estimator comprising:

an array antenna made up of a plurality of antenna elements that receives a signal from a communication terminal apparatus;

first correlation detecting means for calculating a cyclic correlation matrix using a first cycle frequency of a first modulated signal included in the reception signal of said array antenna;

second correlation detecting means for calculating a cyclic correlation matrix using a second cycle frequency of a second modulated signal whose modulation system is different from that of said first modulated signal included in the reception signal of said array antenna; and

direction of arrival estimating means for estimating the directions of arrival of said first modulated signal and said second modulated signal using eigenvalues and eigenvectors of the correlation matrices calculated by said first and second correlation detecting means.

2. The direction of arrival estimator according to claim 1, wherein the first correlation detecting means calculates a cyclic correlation matrix of a spread spectrum modulated signal using a frequency decided from the chip rate of the spread spectrum modulated signal

as the first cycle frequency.

3. The direction of arrival estimator according to claim 1, wherein the second correlation detecting means calculates a cyclic correlation matrix of the second modulated signal by detecting the second cycle frequency of the second modulated signal from the reception signal.

4. The direction of arrival estimator according to claim 2, further comprising data storing means for storing the reception signal, wherein the first correlation detecting means calculates a cyclic correlation matrix using the storage data of said data storing means.

5. The direction of arrival estimator according to claim 1, wherein when there is a plurality of eigenvalues, the direction of arrival estimating means uses absolute values of said igenvalues to distinguish magnitudes thereof.

6. The direction of arrival estimator according to claim 1, wherein the second correlation detecting means detects a plurality of cyclic frequencies from the reception signal and calculates a cyclic correlation matrix of a plurality of second modulated signals.

7. The direction of arrival estimator according to claim 1, comprising N linear array antennas (N: natural number),

which are installed in such a way that the direction of the normal to each array antenna forms an angle of 360° /N with one another, wherein the direction of arrival estimating means estimates the directions of arrival of the first modulated signal and second modulated signal using the reception signal of said linear array antennas and estimates their true directions of arrival for all directions by comparing the estimation results for each of said linear array antennas.

8. A base station apparatus equipped with a direction of arrival estimator, said direction of arrival estimator comprising:

an array antenna made up of a plurality of antenna elements that receives a signal from a communication terminal apparatus;

first correlation detecting means for calculating a cyclic correlation matrix using a first cycle frequency of a first modulated signal included in the reception signal of said array antenna;

second correlation detecting means for calculating a cyclic correlation matrix using a second cycle frequency of a second modulated signal whose modulation system is different from that of said first modulated signal included in the reception signal of said array antenna; and

direction of arrival estimating means for estimating the directions of arrival of said first

modulated signal and said second modulated signal using eigenvalues and eigenvectors of the correlation matrices calculated by said first and second correlation detecting means.

9. A direction of arrival estimation method comprising the steps of:

calculating a cyclic correlation matrix using a first cycle frequency of a first modulated signal received by an array antenna;

calculating a cyclic correlation matrix using a second cycle frequency of a second modulated signal whose modulation system is different from that of said first modulated signal received by said array antenna; and

estimating the directions of arrival of said first modulated signal and said second modulated signal using eigenvalues and eigenvectors of said calculated correlation matrices.